VISUALIZING CANCER PAIN WITH BESI-C TECHNOLOGY

Ayma Khwaja
Bryan Lewis

Can the experience of cancer pain be better understood through optimized visualizations?

BACKGROUND

CANCER PAIN

- 60%-90% of cancer patients experience moderate to severe pain
- Mobile and wireless technology has great potential to support patients with cancer and handle their symptoms

BESI-C (Behavioral and Environmental Sensing and Intervention for Cancer)

- Smart-home monitoring system deployed in homes for 2 weeks to monitor and predict pain
- Uses the data to paint patterns e.g. when a patient may experience pain
- Sensors track environmental variables smart watches allow patients to log in their cancer pain events and answer surveys

FINAL VISUALIZATIONS

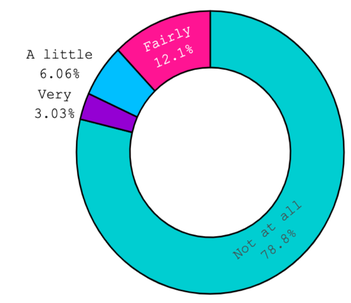


FIGURE 1 Physical Activity of Patients

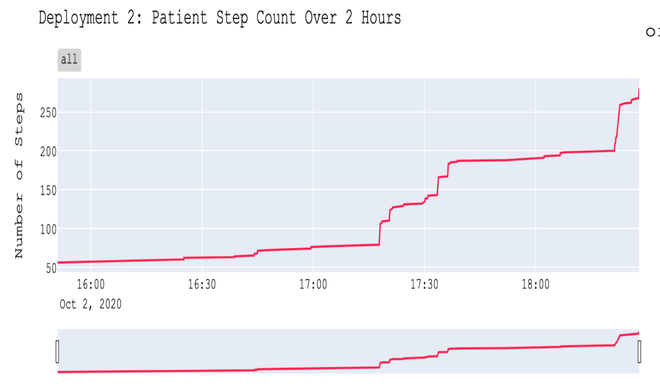


FIGURE2 Patient Step Count Over 2 Hours

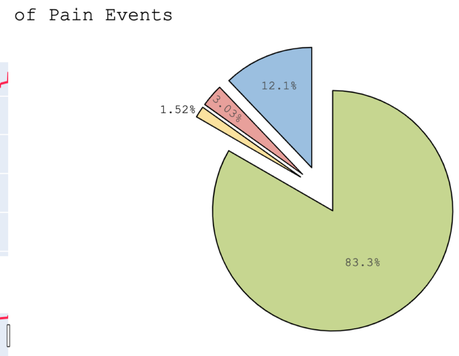


FIGURE 3 Pain Event Locations

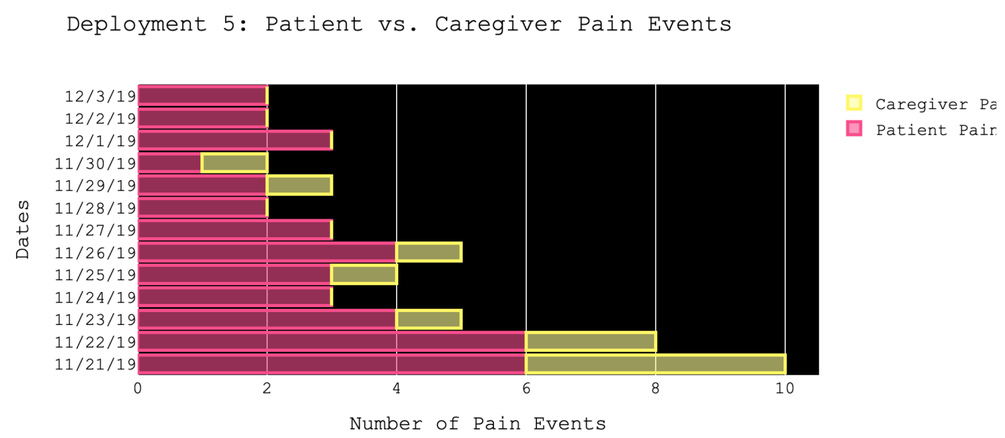
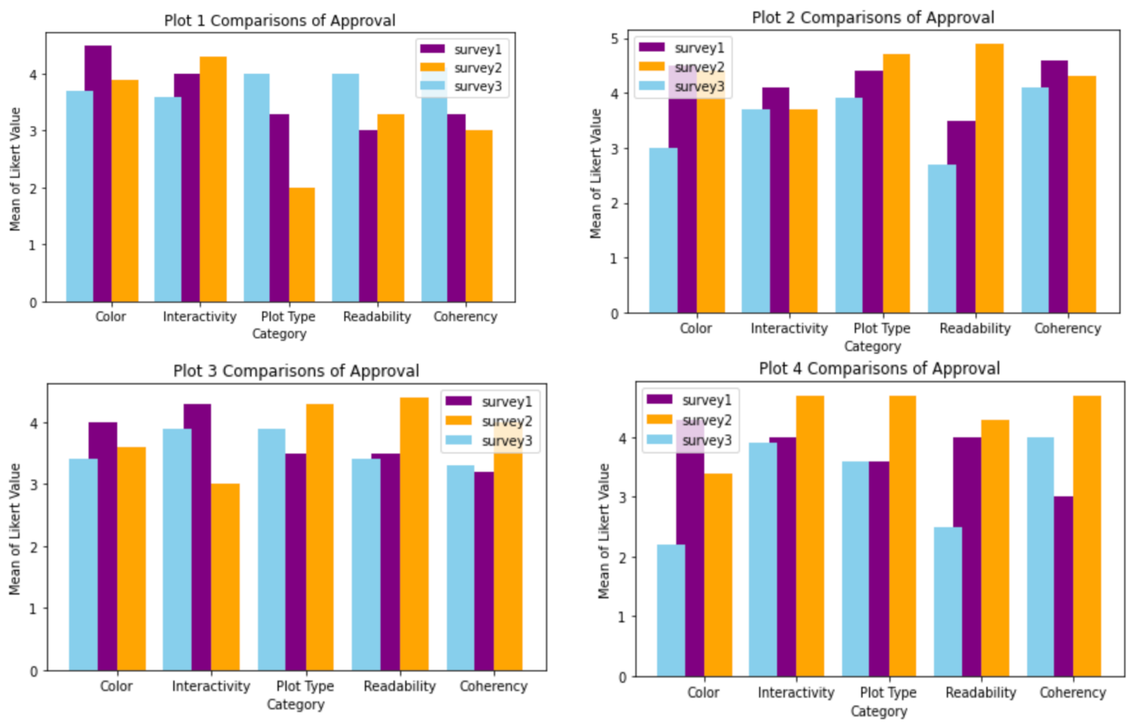


FIGURE 4 Finalized Pain Frequency of Pain Events Plot

ANALYSIS OF THE APPROVAL OF THE 4 PLOTS BASED ON SURVEY



RESEARCH AND FINDINGS

- Created + deployed 3 different versions of each plot (plot type, color schemes, etc.) in each survey
- Analyzed 29 responses from survey participants to finalize charts of each category

ANALYSIS

- Above figures visualize each plots' satisfaction ratings (a mean of the Likert Value) for each category based on different surveys
- Overall, survey participants preferred colorful plots over monochromatic schemes
- Participants looked for simplicity in plot type
- Interestingly, color doesn't influence coherency as much as readability does

MOTIVATION AND GOALS

- Improve our understanding of cancer pain
  - Why and under what conditions it happens
  - Its effect is on both patients and their family caregivers
  - How it's best relieved
- Explore how to best share collected data with patients, family caregivers and health care providers
- Map patients' pain profiles through graphing physical activity, pain frequency, pain location, and step count
- Optimize visualizations through color scheme, interactivity, plot type, readability, and coherency of information
- Integrate visualizations into BESI-C website to reach larger audience and visualize the data

FUTURE

Visualize other categories such as sleep quality to broaden understanding of cancer pain

- Further develop image gallery website using HTML, CSS and Javascript and integrate visualizations

Citations
https://besic.org/
https://www.researchgate.net/publication/343220076